

Inside this issue:

Storms, Winter and Carbon Monoxide	1
Caffeine: A Toxic Case	1
For your Reading Pleasure	1
Caffeine: A Toxic Case	2
Poison Pals	2
Storms, Winter and Carbon Monoxide	3
Caffeine: A Toxic Case	4

Tox Quiz Query

1. What is the IDLH (Immediate Danger to Life and Health) level for CO exposure?
2. How high can CO get next to an outboard engine on a houseboat?
3. How loud does a CO detector sound?
4. What level of CO will trigger a CO detector?



Where healing, teaching and discovery come together.

OHSU includes four schools, two hospitals, numerous primary care and specialty clinics, multiple research institutes and several community service and outreach units.

OHSU is an equal opportunity, affirmative action institution.
11/04(15)

Caffeine: A Toxic Case



A 27 year old male came to an Emergency Department and told providers he took between 75 – 90 Stacker 3® pills, each containing 250 mg of caffeine, in a self harm attempt.

His initial HR was between the 90 – 120's. He was afebrile with tachypnea and hypertension (BP 162/94). He presented with nausea and vomiting. His labs were remarkable for an abnormal anion gap of 23, potassium of 2.3 meq/L. An arterial blood gas revealed pH 7.49, pCO2 16, pO2 147, and Bicarbonate 12.

What is the mechanism of caffeine toxicity?

Caffeine (1,3,7 trimethylxanthine) is a central stimulant sharing properties with other methylxanthines like theophylline. It is theorized to cause antagonism of the adenosine receptor, inhibition of phosphodiesterase increasing cyclic AMP, indirectly increasing sympathetic stimulation, a direct effect on the level of intracellular calcium concentration, and

Continued on page 2

Storms, Winter and Carbon Monoxide

Ahhh, THE HOLIDAYS! 'Tis the season for Jack Frost's appearance and folks dressed for winter roasting chestnuts on an open Hibachi grill in their living rooms...

Yes, 'tis the season for CARBON MONOXIDE (CO) poisoning!

The last ice storms from a few winters ago had a large number of people exposed to and several deaths from carbon monoxide in Portland and Seattle.

What is CO?

CO is a colorless, odorless, tasteless gas produced from the incomplete burning of any fuel. CO binds to hemoglobin and prevents oxygen delivery to tissues. It may be lethal if enough oxygen is displaced.



Continued on page 3



For Your Reading Pleasure

Below are recent publications by some of our Poison Center toxicologists, including Drs. Zane Horowitz, Nate McKeown and Patrick West, and our OPC director, Sandra Giffin, RN, MS.

- West PL, Horowitz BZ, Montanaro MT, Lindsay JN. **Poison hemlock-induced respiratory failure in a toddler.** *Pediatr Emerg Care.* 2009 Nov;25(11):761-3
- West P, Horowitz BZ. **Zigadenus poisoning treated with atropine and dopamine.** *J Med Toxicol.* 2009 Dec;5(4):214-7.
- West PL, McKeown NJ, Hendrickson RH. **Methamphetamine body stuffers.** Published online at *Annals of Emergency Medicine.*
- Giffin S, Heard SE. **Budget Cuts and U.S. Poison Centers—regional challenges create a nationwide problem.** *Clinical Toxicology.* 2009 47;790-791

Oregon Poison Center Staff

Medical Director

B. Zane Horowitz, MD,
FACMT

Associate Medical Director

Rob Hendrickson, MD

Department Director

Sandra Giffin, RN, MS

Medical Toxicologists

Kenneth Bizovi, MD
Mohamud Daya, MD
Nathanael McKeown, DO
Robert Norton, MD
Laura Ryan, MD
Dan Sudakin, MD
Patrick West, MD

Fellow in Medical Toxicology

L. Keith French, MD

Nurse Educators

Tonya Drayden, RN, MSN,
CSPI
Lisbeth Ward-Fowler, RN,
CSPI

Nursing Staff

Teddy Angert, RN, SPI
Brian Arnzen, RN, CSPI
Roberta Bentson-Royal, RN,
NP, CSPI
Christina Brands, RN, CSPI
Maleia Briggs, RN, SPI
Patricia Campbell, RN, SPI
Stacey Crowley, RN, SPI
Bonnie Diessner, RN, SPI
Karen Hansen, RN, CSPI
Karen Hofrichter, RN, CSPI
Nancy Hoke, RN, SPI
Betty Kirkpatrick, RN, CSPI
Amber Lewis, RN, SPI
Marc McDermid, RN, CSPI
Annie Meyer, RN, CSPI
Jami Phillipson, RN, CSPI
Charisse Pizarro-Osilla, RN,
CSPI
Amy Rap, RN, SPI
Alice Schillerberg, RN, CSPI
Kathleen Sheridan, RN, SPI
Mike Svesko, RN, CSPI
Jacqueline Thomas, RN, SPI

Administrative Coordinator, Editor

Terri Welsh

Caffeine: A Toxic Case

(continued from page 1)

uncoupling of the intracellular calcium within the muscular contractile units and indirect effect on intracellular calcium concentration via cell membrane hyperpolarization.

Caffeine is a mild diuretic and keliuretic in low to moderate doses. Adenosine receptor antagonism in the brain can lead to drug resistant status epilepticus.

What signs and symptoms can be seen in overdose?



Similar to theophylline overdoses ...

- Nausea and vomiting are common. Gastrointestinal hemorrhage has been reported following severe intoxication.
- Insomnia, anxiety, restlessness and tremor are common following mild to moderate overdoses. Tinnitus, delirium, headache, low grade fever, photophobia, and seizures are reported with severe intoxication.
- Seizures are generally tonic/clonic and can occur without warning. These seizures can be resistant to the usual medications given for seizures.
- Caffeine may directly produce hypokalemia by activation of Na⁺/K⁺ ATPase membrane pumps, as is seen in theophylline intoxication.
- Sinus tachycardia is common. PVC's, bigeminy, paroxysmal atrial tachycardia, cardiovascular collapse and hypotension (following massive doses) may be noted in severe intoxication.

Lactic acidosis may occur secondary to seizures, hypotension, and a generalized hyperadrenergic state produced by catecholamine release.

Continued on page 4

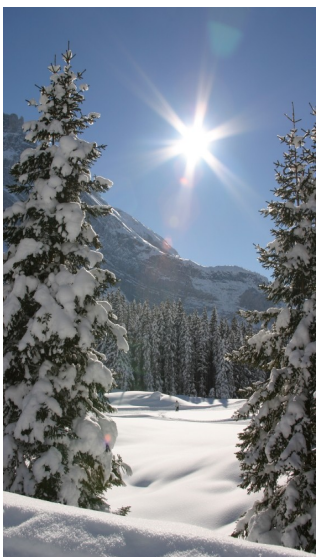
POISON PALS

	<div data-bbox="834 1602 1135 1642" data-label="Section-Header"> <h3>Poison Pals</h3> </div> <div data-bbox="596 1659 1378 1692" data-label="Text"> <p>praise ▪ credit ▪ glory ▪ kudos ▪ thanks ▪ appreciation ▪ respect ▪ admiration</p> </div>	
	<div data-bbox="696 1726 1278 1768" data-label="Text"> <p>Kelly RN, ICU, Sky Lakes Medical Center</p> </div> <div data-bbox="751 1787 1221 1827" data-label="Text"> <p>Trish RN, IMCU, Salem Hospital</p> </div> <div data-bbox="701 1845 1271 1885" data-label="Text"> <p>Jasmit RN, Unit 3300, Portland Adventist</p> </div>	

Don't forget:



We are always here.



Storms, Winter and Carbon Monoxide

(continued from page 1)

What symptoms do patients complain about?

Headache, dizziness, nausea, and syncope are common making it a difficult, but very important, diagnosis to make.

Any tips for finding CO poisoning?

Ask about any others who are ill at home (including pets) as well as new heaters, generators, or indoor grilling.

Bright red blood on venous draw is a classic sign.

Won't I see low oxygen sats?

O2 sat is NORMAL in these patients, but a simple blood test for "carboxyhemoglobin" will confirm the diagnosis.

What is the treatment for CO poisoning?

Oxygen by NRB mask.

If others remained at home, ensure their safety. If a patient's level is high hyperbaric (pressurized) oxygen therapy is required.

Providence Portland has the only chamber in Oregon. Call the Poison Center (1-800-222-1222) for any suspected or confirmed cases to assist in workup and transfer.

Indications for Hyperbaric O2 therapy:

Loss of consciousness COHgb >25%, or >15% in pregnancy and neurologic symptoms that don't clear with oxygen.

Toxicology Journal Club

The **Toxicology Journal Club** podcast is now available to listen to as streaming audio or for download in mp3 format.

The topic for **October** was **Reye's Syndrome and Aspirin**, and the topic for **November** was **Metformin-associated Lactic Acidosis**.

Visit <http://www.emergencyresidency.com/index.php#toxpodcast> where you'll find the November Podcast, now easily playable in your browser via the Yahoo mp3 player.

Fall/Winter 2009
Volume 2, Issue 2

Page 3

TOXICOLOGY PODCAST ARCHIVE

You can visit http://www.emergencyresidency.com/index.php?option=com_content&task=view&id=63&Itemid=217 to listen to past Toxicology club podcasts on the audio player.

Tox Quiz Query Answers:

1. 1200 ppm
2. 30,000 ppm
3. According to Underwriters Labs they must sound at a piercing 85 decibels
4. IT will sound if it detects 400 ppm for 15 minutes

Check out the funny new video from our colleagues at the **Texas Panhandle Poison Center**

Poison Is Bad



www.poisonisbad.com

©2009 Texas Panhandle Poison Center. All Rights Reserved

Fall/Winter 2009
Volume 2, Issue 2

Page 4

Caffeine: A Toxic Case

(continued from page 2)

What would be the possible therapy options in this patient?

- Generally supportive treatment is indicated for an overdose of caffeine.
- Antiemetics should be given as these patients will have intractable vomiting. Zofran at doses of 8 to 16 mg can be given.
- Single and multiple doses of charcoal (secondary to enterohepatic recirculation) can be given depending on the level of consciousness and the amount of vomiting.
- Consideration should be given to administering midazolam or phenobarbital as prophylaxis for the prevention of seizures. If seizures occur – benzodiazepines are first line therapy followed by barbiturate class, although clinicians should have a low threshold for intubation and initiation of a propofol drip.
- Supraventricular tachycardias usually respond to sedation with benzodiazepines.
- Beta blockers are the drugs of choice for dysrhythmias in a normotensive patient.
- At some institutions caffeine levels can be obtained, however there has not been shown a correlation of levels with toxicity.
- Caffeine has a small volume of distribution, subsequently hemodialysis should be considered in these patients with seizures or dysrhythmias. While currently there have not been any levels at which HD is recommended it should be thought of as similar to theophylline toxicity.

BECOME A FAN!



OPC is on Facebook!